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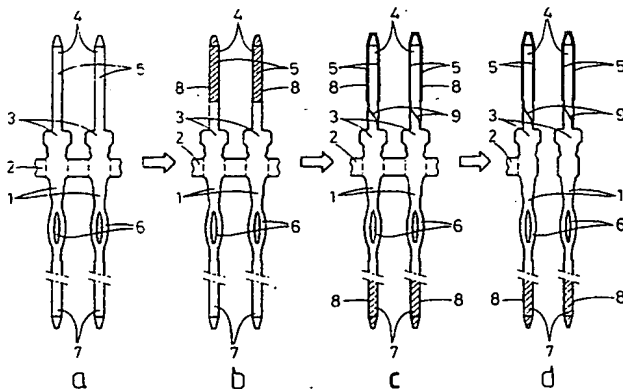
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Method for manufacturing contact pins.

Method for manufacturing contact elements from a strip of conductive material, wherein successive contact elements are formed in the strip by cutting away parts between the successive contact elements. Each contact element is made with a contact means with opposite contact faces for contacting a

complementary contact element. The contact means of each contact element includes a twisted portion in such a manner that the contact means is twisted along an angle of substantially 90° with respect to the plane of the material strip.



The invention relates to a method for manufacturing contact pins from a strip of conductive material according to the preamble of claim 1.

In applying this known method the contact faces are formed on the contact pin parts at opposite sides of the strip, so that the contact faces of the contact pins obtained extend in the plane of the material strip. The faces of the contact pin parts extending transverse to these contact faces are not suitable for contacting a complementary contact element due to the step of cutting away the portions of the strip lying between subsequent contact pins.

The invention aims to provide a method of the above-mentioned type whereby contact pins are obtained with a contact pin part with contact faces extending transverse to the plane of the material strip.

To this end the method of the invention is characterized by the characterizing features of claim 1.

By means of the method of the invention contact pins can be manufactured which are particularly suitable for applications wherein the contact pins must be closely spaced. Further, contact pins can be manufactured for application in connector assemblies for connecting printed circuit boards at both sides of a central printed circuit board, wherein the printed circuit boards cross each other perpendicularly. Such contact pins are made with two contact pin parts with contact faces for contacting complementary contact elements, wherein in this case one contact pin part is twisted along 90° with respect to the other contact pin part.

The invention will be further explained by reference to the drawings in which Figs. a, b, c and d show successive steps of an embodiment of the method according to the invention.

Fig. a shows two adjacent contact pins 1 formed out of a strip of conductive material, such as for example a suitable copper alloy, of which only a narrow band 2 is present connecting the successive contact pins with each other. The parts of the material strip lying between the successive contact pins 1 are cut away. As shown in Fig. a the intermediate parts are cut away in such a manner at the top side of the narrow band 2 that the contact pins have a shoulder portion 3 lying in the plane of the strip. Above this shoulder portion 3 each contact pin 1 has a contact pin part 4 with opposite contact faces 5 lying in the respective main planes of the strip and are therefore extending substantially parallel to the shoulder portions 3. These contact faces 5 are formed in a usual manner for contacting a complementary element. The faces of the contact pin parts 1 directed towards each other are not suitable for contacting a complementary contact element due to the cutting

away of the intermediate parts of the strip.

In the embodiment shown the contact pins 1 are provided at their lower side with a press fit portion 6 known per se, wherein a contact pin is adapted to be inserted into a hole of a printed circuit board with this press fit portion 6. This press fit portion 6 guarantees a good contacting of the wall of the hole plated with a conductive material, and holds the contact pin 1 in the hole. The shoulder portion 3 is provided to press the contact pin 1 in a suitable manner into the hole of the printed circuit board.

The contact pin part 7 of each contact pin 1 opposite of the contact pin part 4 can also be provided with opposite contact faces 5 extending in the main planes of the material strip. Such contact pins 1 with two contact pin parts 4, 7 are suitable for applications wherein the contact pins should be contacted at both sides of a printed circuit board.

In Fig. b it is indicated that in the embodiment shown the contact faces 5 of the contact pin parts 4 are advantageously plated with a noble metal, such as for example gold, when the contact pins 1 are still in the material strip. The coating layer 8 obtained is shown in the drawing by shading. Thereby a good contact with complementary contact elements can be guaranteed.

Fig. c shows that the contact pin parts 4 are twisted along 90° with respect to the plane of the material strip when the contact pins 1 are still in the material strip. In this manner the contact pin parts 4 each include a twisted portion 9. Thereby it is obtained that the contact faces 5 extend transverse to the direction of the shoulder portions 3. Finally, the contact pins 1 are cut loose from the material strip as shown in Fig. d. A coating layer 8 of the contact faces of the contact pin parts 7 is schematically shown by shading in Figs. c and d.

By means of the method described contact pins 1 are obtained wherein the contact faces 5 of the contact pin part 4 extend transverse to the shoulder portions 3. The contact pins 1 are thereby particularly suitable for application in connector assemblies in systems with a central printed circuit board, wherein printed circuit boards mutually crossing each other perpendicularly are connected to the central printed circuit board at both sides. Further, the contact pins 1 are very suitable for applications, wherein the contact pins must be closely spaced.

The invention is not restricted to the above described embodiment which can be varied in a number of ways within the scope of the claims. It will be understood that the described embodiment of the contact pins 1 is only an example and that the method of the invention can also be applied at other types of contact pins.

Claims

1. Method for manufacturing contact elements from a strip of conductive material, wherein successive contact elements are formed in the strip by cutting away parts between the successive contact elements, wherein each contact element is made with a contact means with opposite contact faces for contacting a complementary contact element, **characterized in that** the contact means of each contact element includes a twisted portion in such a manner that the contact means is twisted along an angle of substantially 90° with respect to the plane of the material strip.
2. Method according to claim 1, wherein the surfaces of said contact means lying in the plane of the strip are plated as contact faces with a noble metal before twisting the contact means.
3. Method according to claim 1 or 2, wherein the contact elements are cut loose from the strip after the twisting step.

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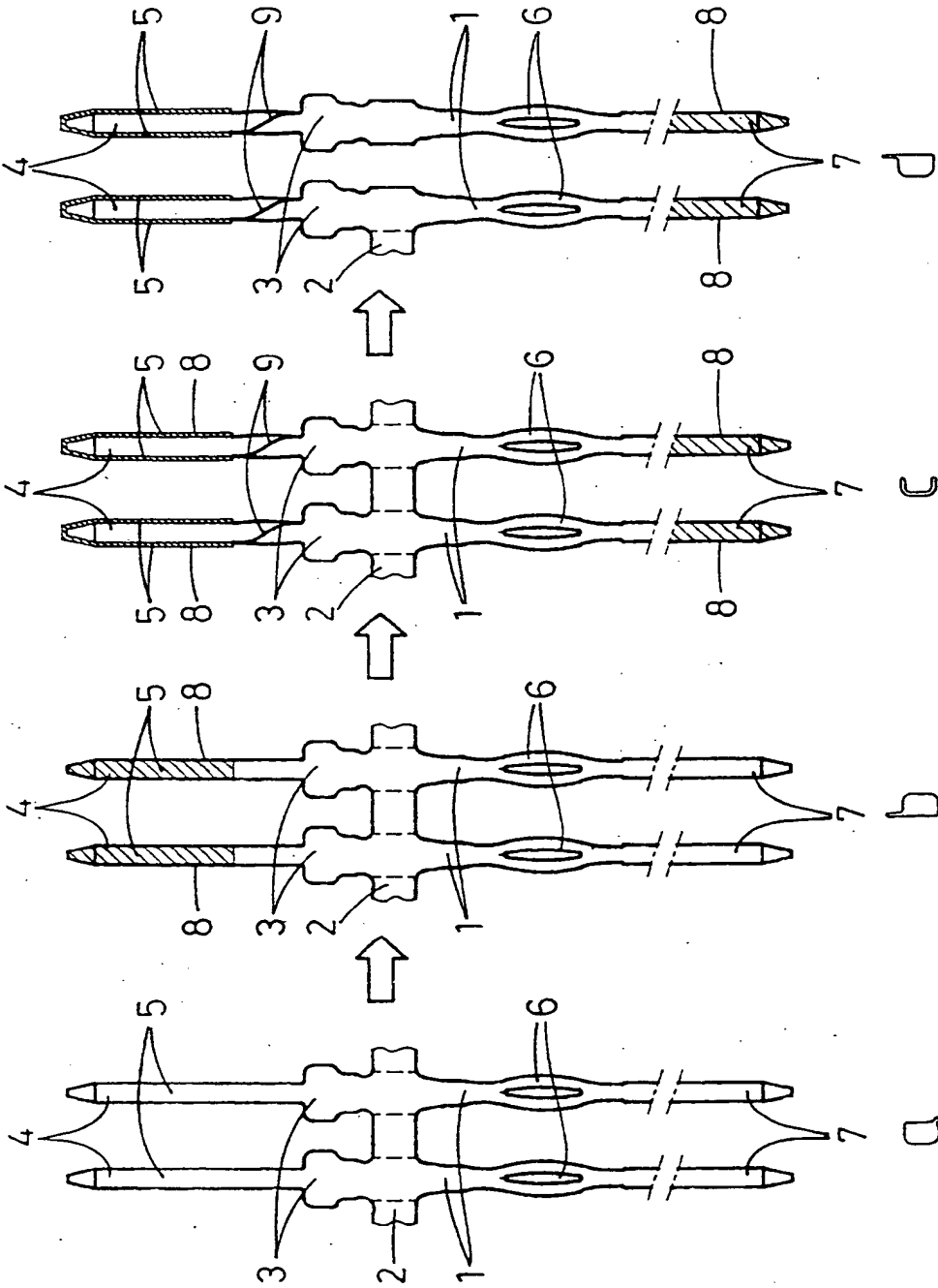
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EUROPEAN SEARCH REPORT

Application Number
EP 94 20 1555

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
X	DE-A-26 31 107 (ELFAB CORP.) * page 22, last paragraph - page 24, line 1 2, paragraph 1; figures 1-23 *	1,3	H01R43/16 H01R9/09
X	EP-A-0 047 469 (ZÜST HARRY) * page 7, paragraph 2; figures 1-8 *	1,3	
X	US-A-3 530 422 (DAVID S. GOODMAN) * column 2, line 47 - column 3, line 611; figures 1-5 *	1	
A	US-A-5 183 421 (YIN) * column 3, line 19 - column 5, line 15; figures 1-6 *	1-3	
A	DE-A-37 24 033 (ERNI ELEKTROAPPARATE GMBH) * column 2, line 18 - line 62; figures 1-6 *	2	
			TECHNICAL FIELDS SEARCHED (Int.Cl.5)
			H01R
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 1 September 1994	Examiner Tappeiner, R
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